

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
14 April 2005 (14.04.2005)

PCT

(10) International Publication Number
WO 2005/033641 A2

- (51) International Patent Classification⁷: **G01K**
- (21) International Application Number:
PCT/US2004/032054
- (22) International Filing Date:
30 September 2004 (30.09.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/507,732 1 October 2003 (01.10.2003) US
- (71) Applicant (for all designated States except US): **KRY-OTEC, INC.** [US/US]; 2547 Morningside Drive, West Columbia, SC 29169 (US).
- (71) Applicant and
(72) Inventor: **RUTH, John, D.** [US/US]; 5131 E. Tamblo Drive, Phoenix, AZ 85044 (US).
- (74) Agents: **WEVER, Michael, E.** et al.; Nelson Mullins Riley & Scarborough, P.O. Box 11070, Columbia, SC 29211 (US).

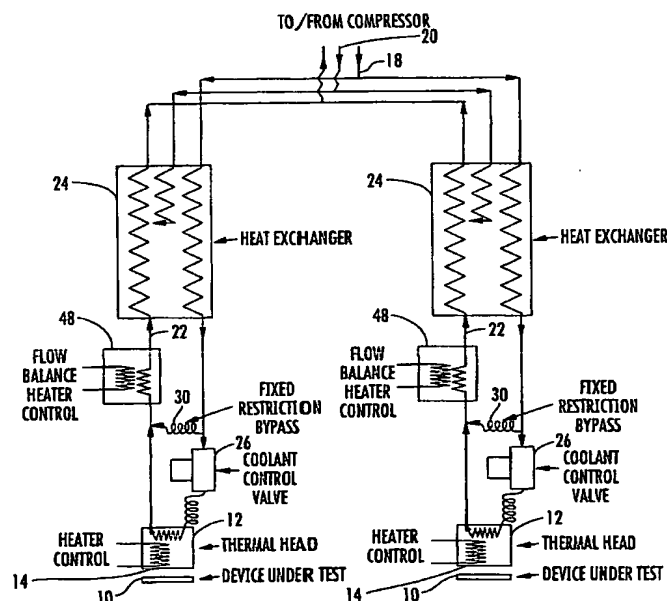
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: APPARATUS AND METHOD FOR CONTROLLING THE TEMPERATURE OF AN ELECTRONIC DEVICE



(57) Abstract: An apparatus for controlling the temperature of an electronic device. The apparatus comprises a refrigeration system including a compressor and a multi-pass heat exchanger. The refrigeration system is operative to circulate a refrigerant fluid through a fluid flow loop such that the refrigerant fluid will change between gaseous and liquid states to alternately absorb and release thermal energy. The refrigerant fluid is pre-cooled in the heat exchanger by a pre-cooling refrigerant stream. A thermal head is connected into the fluid flow loop and has a temperature controlled surface.